

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (canceled)

2. (previously presented) An athermal optical element comprising a surface of a crystalline, cubic material with a surface figure of <200 nm, said material having an index of refraction, n , and a coefficient of expansion, α , such that:

$$dn/dT = -n\alpha,$$

wherein T is temperature.

Claims 3-14 (canceled)

15. (previously presented) An athermal, optical composite material comprising a number of layers, m , at least two layers having different compositions and different values of dn/dT , wherein the total optical pathlength, nL , across all of said layers m is essentially independent of temperature; the optical parameters of said layers satisfying the equation

$$\sum_{i=1}^m L_i (dn_i/dT + n_i \alpha_i) = 0$$

where m is the number of layers, L_i is the [total] thickness of the i^{th} layer in the direction of optical use, n_i and α_i are the refractive index and thermal expansion of the material making up the i^{th} layer

and dn_i/dT is the variation of refractive index of the material making up the i^{th} layer with temperature T , and at least two of said values of dn/dT have opposite signs.

16. (original) A composite material of claim 15 wherein each of said layers comprises a glass composition, a crystalline material or a polymeric material.

17. (original) A composite material of claim 15 wherein said layers are glass/crystalline, glass/polymeric or polymeric/crystalline composites.

18. (original) A composite material of claim 17 having a surface with a surface figure of <200 nm.

Claims 19-29 (canceled)

30. (original) An athermal, optical composite material comprising at least two layers of different compositions, wherein the total optical pathlength, nL , across said two layers is essentially independent of temperature; and wherein n is index of refraction, L is the total thickness of the layers, and T is temperature.

31. (original) A composite material of claim 30 wherein each of said layers comprises a glass composition, a crystalline material or a polymeric material.

32. (original) A composite material of claim 30 wherein said layers are glass/crystalline, glass/polymeric or polymeric/crystalline composites.

33. (original) A composite material of claim 32 having a surface with a surface figure of <200 nm.

Claim 34 (canceled)

35. (currently amended) An optical element of claim 1 ~~2~~ wherein said surface is sufficiently large to function as a demultiplexer.

36. (currently amended) An optical element of claim 1 ~~2~~ wherein said surface is exposable to air.